POPULAR Computing WEEKLY

29 July 1982 Vol 1 No 15

35p

Meltdown on Vic 20

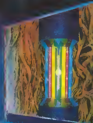
BBC graph plot

ZX81 keyboard repeat

Spectrum

Goto destinations

Win a ZX Spectrum & ZX Printer — details inside





POPULAR Computing WEEKLY

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How to submit articles
Articles which are submitted for publication should not be more than 1000 words long.

All submissions should be typed and a double space should be left between each line.

Programs should whenever possible, be computer printed.

At present we cannot guarantee to return every submitted article so please keep a copy.

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work

This Week



Editorial

In common with most other microcomputing magazines we are inundated with programs Every day readers send in programs in the hope of having them published in Open Forum

However most of these programs are based around a few basic games Moonlander Space Invader and Fruit Machine programs abound Puckman is another favourite

There is nothing wrong with these games They have provided hours of fun and entertainment for microcomputer enthusiasts.

But there is little purpose in reinventing the wheel While there is a certain amount of satisfaction to be gained from writing your own version of noughts and crosses or meteor run there is far more satisfaction in writing a completely original program

Once you have mastered the basics of programming there is little point in continually imitating other people's efforts You will learn more from thinking up your own games than you will from copying established programs

Writing software programs is rather like learning to fly There comes a point where you must go solo

Next Week



A deadly assassin has disrupted your jungle Kingdom and must be eliminated in this new game for Spectrum — Hunter Killer

Classified

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Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

[illegible]

Sinclair to launch dial-a-program

SINCLAIR is developing a Prestel adaptor for the ZX Spectrum. It should be available in the first half of next year and will cost substantially less than £100, according to Nigel Searle, head of Sinclair's computer division.

The Prestel adaptor will make it possible to both upload and download software from the Spectrum to Prestel. Instead of loading programs from cassettes or discs you will be able to dial a program directly into the Spectrum via a tv set.

There are a number of advantages in using Prestel or Teletext said Searle. Telesoftware can be constantly updated and it obviates the need for large storage devices.

But the key to the success of this scheme is the cost of the adaptor. Mattrachance Ltd, winner of the British Telecom ZX81 Prestel adaptor competition, will be charging in the region of £120-£150 for their adaptor when it goes on sale.

A Spectrum adaptor will be substantially cheaper because the Spectrum already contains a colour modulator. But even allowing for this it is likely to cost at least £50 and possibly as much as £8.


Sinclair's Nigel Searle

However Searle is convinced that telesoftware will play an increasingly important part in the home computer market. "The future of personal computing lies in communication," he said.

Japs aim for a supercomputer

THE development of a human computer is the long term aim of a new Japanese research program.

The 10-year project has been started by a team of workers in Japan. The hope is to make a 5th generation computer that will reason and speak much like a human.

The work, being carried out at the Institute for New Generation Computer Technology in Tokyo, is still in its initial stages.

The problem-solving and inference making parts of the project will be key developments. It is hoped to produce a supercomputer that can make more than 100m logical inferences per second — an order of about 1000 times faster than present computers.

Reaction to the proposed development has been muted.

Welcome to the machine

THE British Passport Office has been evaluating equipment capable of handling machine readable passports.

But already civil rights organisations fear a further invasion of individual privacy if the system was to be linked to other computers such as the Police National Computer.

A Home Office spokesman has insisted that no such link is planned.


A pet watching in the Cleveland Boys' hike

Setting Pets loose in wide-open spaces

PETS are venturing out into the moorlands.

The progress and safety of those taking part in the annual Cleveland Boy's Brigade hike on June 26 and 27 has been monitored using a Commodore Pet.

The two-day event involves an exhausting traverse of the North Yorkshire moors. Each team must complete a course planned between 10 widely spaced checkpoints.

The Pet is used to provide up-to-date information of the stages of the event and to warn of groups that are overdue at their check points.

Apart from the vital safety that the micro system affords it is also used to give a breakdown of each hiker's position points and overall time with the minutes of the last walker crossing the finishing line.

Soft soap from Sinclair

SINCLAIR is giving away a cassette of introductory programs with every ZX Spectrum.

By the end of August each Spectrum buyer should receive a free Horizons software starterpack. Those with Spectrums already will also get their packs, though it may be September before they arrive.

The Horizons cassette is produced for Sinclair by Psion.

On one side is a five-level keyboard trainer program. On the other side there are ten demonstration programs putting the micro through its paces.

Sinclair is expected to release further software for the Spectrum shortly.

Dragon goes for a two-pronged attack

HARD on the heels of the announcement of the new Dragon 32 micro comes news of a further machine from Mettoy.

The company is to produce an advanced Dragon in early 1983.

It will have 64K Ram, enhanced graphic capabilities and will probably include a disc-operating system and be capable of running CP/M software.

Aimed more at the business user, the machine will sell for under £250.

Development of the mini-floppy disc system for the Dragon 32 is well advanced and the system is planned to be available at the end of this year.

Spectrum now visibly extended

KEMPSTON Electronics has launched a selection of add-ons for the ZX Spectrum.

The company has produced a two-slot motherboard and a 24-line input/output port.

The port is accessed by the In and Out commands on the Spectrum. Built around a single MOS chip, the port is mapped and can be configured in a variety of ways. The three 8-bit I/O ports can be assigned as either In or Out by the Spectrum.

When the port is used together with the motherboard the second slot can be used for a stackable connector or to add a printer or microdrive.

THE I/O port costs £16.50. The two-slot motherboard costs £16.95. Both are available from Kempston (Micro) Electronics, 60 Adamson Court, Hillgrounds Road, Kempston, Bedford.

Gargle-blasting

SINCLAIR Research now has a staff of 42. Those not familiar with the *Hitch Hiker's Guide To The Galaxy* should note that this number is the answer to life, the universe and everything.

READ-OUT

READ-OUT FOR SOFTWARE & BOOKS

POPULAR COMPUTING WEEKLY/READ-OUT BOOK SERVICE

For the BBC Micro

If you own a BBC Micro the *Practical Programs for the BBC Computer* by David Johnson Davies is the book for you! It contains over twenty practical programs ranging from maths and graphics to language manipulation and games. The programs have been tested and they work!

Now that Auntie Beeb is actually delivering its micros to customers *BASIC Programming on the BBC Microcomputer* by Neil and Pat Cryer will provide an excellent introduction on how to program in BASIC specifically for the BBC Micro. Every program has been tested on a production model.

For the ZX81

Byteing Deeper into Your ZX81 by Mark Harrison is the bestseller which tells you how to get to grips with your ZX81 and with 38 programs to match!

The ZX81 Pocket Book by Trevor Toms covers the use of the ZX81 in detail and leads the reader into a clear understanding of programming.

20 Simple Electronic Projects for the ZX81 by Stephen Adams can really put your ZX81 to practical use in a number of electronic projects — thermometer, burglar alarm, voltmeter etc.

34 Amazing Games for the ZX81 by Alistair Gourlay shows you what you can do with only 1K of memory.

For the Beginner

An excellent introduction for beginners and an invaluable aid for enthusiasts is *The Personal Computer Book* 2nd Edition by Robin Bradbeer which tells you all you need to know about microcomputers.

"... sets out in a very entertaining and readable form the facts on owning a computer ..." *Computing Today*

"Robin Bradbeer's book provides all the information in one place in a sensible order and in a consistent, clear style." *Practical Computing*

For the PET

Learning to Use the PET Computer by Garry Marshall is the first in a series of books that introduces popular micros (others to follow are ZX81, ZX Spectrum, VIC 20 and BBC Microcomputer). It eases the reader into a clear understanding of his computer.

Programming the PET/CBM by Raeto West is quite simply the best book on the PET ever published. It contains everything you'll ever need to know about the PET and its workings.



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Letters

write to Letters, Popular Computing Weekly Hobhouse Court 19 Whitcomb Street, London WC2

Whether tis nobler to have 10 megabytes etc.

WITH regard to Robert Lober's letter (*PCW* July 1) he says "I am sure it is better to have a highly expandable system with the most powerful Basic and the highest res graphics for under £400 than a ZX Spectrum which can only play one note at a time compared with the BBC's four."

May I say that Mr Lober misses the point. The ZX Spectrum costs £125 compared with the BBC Model A's £299. *It would be better to have a 10 megabyte computer that did the washing up than an unexpanded ZX81!*

PS Mr Lober also says the Sinclair claims the BBC micro has no *Verify* command. This is incorrect. If you look in the "comparisons table" you will see there is a tick in the *Verify* section of the BBC micro's column.

Michael [illegible]
[illegible] Road
[illegible]
Birmingham [illegible]

I say, just a minor gripe or three . . .

I AM writing in response to your review (July 8) of the Dragon 32 micro. Of the computers which this machine is most likely to affect, most prominent is probably the Texas Instruments 99/4A, which is currently selling at Argos for £199 — quite a drop from the £340 which it sold for earlier in the year, and an even steeper drop from the £895 which I paid for my starry NTSC 4 some few years ago.

What has really prompted my response is the statement in your Dragon review where you state that *Print @* and *Print Tab* are fulfilling the same function. They most certainly do not. Somebody is missing something!

Print @ allows you to specify both a screen row and a screen column as the starting point for the printing of a piece of information. This not only enables you to format the screen output very effectively but also permits the printing of information in any sequence — ie first bottom of screen then top, then middle say — and without disturbing the current contents of the screen by scrolling.

Print Tab on the other hand is a function of the standard *Print* command which (a) allows the specification of a screen column only and (b) follows the sequential print out, perhaps involving scrolling on some machines, on others following the printout from top of screen to bottom.

To say that the two commands are virtually indentical is to say that *Input* and *Inkey$* or *Get* are identical. True they perform similar functions but would you say that only one was necessary?

Apart from this I have only one minor gripe. It is confusing when you refer to yourselves as *PCW* as *Personal Computer World* beat you to that one four years ago. The use of initials not only saves time when writing, it is also far easier to communicate verbally. The trouble is that now we have to differentiate between the two *PCWs*. Any suggestions?

Finally I must echo the comment of one of your readers with respect to Citizen Pain. Either expand it into a full feature or drop it altogether, please.

Peter [illegible]
[illegible]
[illegible]
[illegible]

Hey presto: you too can be an editor

RECENTLY I was looking through some of my old computer magazines and I stumbled across a letter in the Peek & Poke section of *PCW* issue number 5 from Simon Cray who complained of not being able to edit. All he had to do is to clear the screen before he presses Edit and hey presto the line should appear at the bottom of the screen. I used to have the same problem when working in 1k on my ZX81.

Ian [illegible]
[illegible] Square
[illegible]
[illegible]
[illegible]

Having three bytes at the cherry

UNFORTUNATELY for program writers when Sinclair de-bugged the ZX81 they changed the addresses of some of the routines in the Rom. In particular Slow and Fast were both moved up by three bytes.

Consequently readers who have machines with the new Rom should make the following changes to my Remloader program (June 17).

28 at 16517 should be changed to 56
[illegible] at 16567 should be changed to 35

D L P M [illegible]
[illegible] Manor Park
[illegible]
Exeter [illegible]

Just delighted to become debugged

As a Sinclair ZX81 user I am very impressed by the aims of your magazine in bringing to the home computer user a combination of informative articles and programs in a weekly publication. However I have found the error rate in your published programs a little annoying, especially in your cover story programs.

I have only taken the trouble to key in two of these to date and both had a number of errors. This is particularly infuriating when the programs are supposed to be computer printed. One can only assume that your writers do not attempt to run the program fully once written. The particular programs I refer to are *Planet Ruler* by Dave Middleton and *Shark Attack* by Dave McGuire. The bugs I refer to are as follows:

Planet Ruler
Line 9000 Let C = INT RND*10

This line as printed will always return the value 0 for C and therefore the cost of opening a mine will always be 17. The line should read LET C = INT (RND)x10)

Line 3000 LET P = P + 1

This will only increase the population by one each year irrespective of the number of immigrants calculated and displayed. The line should read LET P = P + I

In addition there should be a line 6215 *Pause* 75 as the present listing clears the screen before the player has a chance to read the [illegible] at 6205 and 6210.

I would also comment that, for a program which hinges around the screen display of written information for the player, the said display was most unimaginative. Judicious use of the *Tab* and *Print at* functions would have improved this immeasurably.

Your response to this may be that you expect your readers to amend the published programs in their own code. However speaking for myself if I have spent two hours keying in a program I have no desire to spend another two hours tidying it up before I am able to run it satisfactorily.

There are two errors in the *Shark Attack* program which luckily I was able to spot before I wasted a lot of time keying it in. This was because I have just started to work my way through Toni Baker's excellent book on machine code. Had I not had this advantage I imagine that I would have spent several frustrating hours trying to get the program to run and failed.

In the machine code loader there should be a line 45 LET A=A+1, otherwise the loader continues to *Poke* the code to 16514. The machine code routine should end with a return instruction (return to *Basic*) or the code will crash. There is therefore an additional byte to those printed which should have the value 201.

Once running, the program was immensely enjoyable. I think it is a pity that many of your readers were probably frustrated in their efforts to load the program correctly by these errors.

James [illegible]
[illegible]
[illegible]
Hertfordshire

Meltdown

A new game for Vic20
by Malcolm North

You are in control of a nuclear power station. The automatic control systems have broken down. As the senior officer on duty, it is your responsibility to prevent the uranium core from going critical and covering the surrounding countryside with radioactive waste.

There is an emergency back-up system, complete with manual controls, for governing the power station. Unfortunately, the back up system only has a limited power supply. When the power runs out there is nothing to stop the core from going critical.

Your primary duty is to keep the core from melting down for as long as possible, giving the local population a chance to escape. If you manage to keep the station running for two and a half hours, a specialist repair team will arrive and mend the broken control systems.

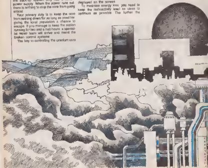
The key to controlling the uranium core lies in the carbon damper rods. These rods absorb the neutrons emitted by the uranium. Thus, by raising and lowering the rods, you can control the speed of the nuclear reactions inside the core.

This program runs on an unexpanded Vic20. You can control the damper rods by means of the function keys.

The damper rods, the level of radioactivity, the power supply for the back-up controls, and the elapsed time are all displayed on the screen.

To minimise energy loss, you need to keep the radioactivity level as close to optimum as possible. The further the radioactivity level gets from the optimum point, the more power is used up. If the level of radioactivity gets too high, nothing can stop the core from melting down.

Just to make things more difficult, the longer the game goes on the faster the changes in the level of radioactivity in the core. It will take a skilful player to survive until the repair team arrives.





Reader Survey

We would like to know more about you. To that end the eccentric academic Boris Allan has devised a novel way of allowing you to express your views. It is all done by numbers.

All you have to do is fill in the boxes below, write a slogan, send the page (or a copy) to *PCW* and you stand a chance of winning a £10 gift voucher.

Boris Allan writes: Some magazines are more alike than others. For example, some magazines usually have better love stories than others and magazines with recipes tend to have knitting patterns — but not always.

Use your judgment to make such comparisons and fill in these boxes on a scale from 1 to 7. If two items are more or less identical give a score of 1, eg *Your ideal computer magazine* will always have *Bug free programs* put a 1 in that box.

If two items are totally different, or never go together, give a score of 7, eg if *Your ideal computer magazine* will never have *Old news* give a score of 7. If you do not know, give a score of 4. If you did not read one of the magazines leave the appropriate box blank.

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Male ☐
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Name

Address

Age
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16 to 20 ☐
21 to 25 ☐
26 to 35 ☐
36 to 50 ☐
51 and over ☐

What three things would you most like to see in *Your ideal computer magazine*?

1 ☐ 2 ☐ 3 ☐

What three things would you not like to see in *Your ideal computer magazine*?

1 ☐ 2 ☐ 3 ☐

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Yes ☐ No ☐

Have you had difficulty finding copies of *PCW*? If so please say where

And now for the fun bit, which could win you some money. Pretend that you have been commissioned by a leading advertising agency to write a promotional slogan for *Popular Computing Weekly*.

My advertising line (in less than 15 words including the name *Popular Computing Weekly*) is

Now either cut out this page, or make a copy, and send it to *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.



The stalwart Tony Latham with neighbour and partner John Knight

Their problems shared are soon solved

***David Kelly** talks to Tony Latham of the Computer Users Club*

Someone must have once observed that the quickest way to learn about a person is to look at the place where they live.

Tony Latham's abode gives many clues as to his main enthusiasm. Tucked away in every corner of his living room are bits and pieces of computers. And there is evidence of his handiwork everywhere — the suite of furniture is home-made and the lowered glass ceiling hides a complex disco-lighting arrangement.

He cheerfully recalls that he has been involved with electronics all his working life. As an engineer he trains electronics apprentices. When Tony first became interested in microcomputing everyone was still having to design their own — the Latham computer cluttered up the back-room for some time.

In July last year Tony helped to set up the Computer Users Group. Despite the fact that they keep a low profile and do not advertise, knowledge of the group has spread by word of mouth. Now 12 months after formation the club has over 500 members.

The group offers a monthly newsletter and a friendly telephone or return-of-post problem-solving service.

Originally started by a small number of electronics students who went their separate ways but stayed members, the Computer Users Group has quickly become established as more than a local or regional group. Now it has members as far afield as the Outer Hebrides, Europe and even Africa.

Although members have all sorts of machines, Tony thought it important to standardise the output from the group. For this reason, shortly after the club began the BBC micro was selected as the common medium of the group.

Since the size of the Computer Users Group has grown it now takes three pairs of hands to keep it running — Tony, his wife Ina, and a neighbour, John Knight.

Most subscribers are professional or business people of one sort or another — chemists, headmasters, shop keepers, lecturers. As a result most of the information the club provides and disseminates in its monthly 15-page newsletter has tended to be applications based.

Programs published by the club are thought out, not just to be of direct use but because it is hoped to demonstrate different programming techniques.

When the idea of an educational Hangman program was thought up, one of the group who is a conductor provided a musical accompaniment for the game in three-part harmony. Another subscriber is using a micro to assist in the design of a zoo.

When Tony and his helpers first decided that they wanted to help people in difficulties with their micros they thought of opening a shop.

When that proved to be too costly to set up they organised the Computer Users Group. With membership quickly increasing they are well pleased and believe they are providing a much-needed service.

Membership costs £6 or £12 for either a six month or twelve month subscription.

For further details contact Tony Latham, Computer Users Club, 72 Sidmouth Road, Welling, Kent (Tel: 01-304 3910).

What's happening

Streetly Computer Club has been formed and meets every second Sunday at the Streetly Community Centre, Foley Road East, Streetly. For more details contact Paul Fitzmaurice, 86 Bankside Crescent, Streety, Sutton Coldfield.

Putting on a joint show in Sussex

Six micro clubs in Sussex joined together to hold a mini computer show at Ifield School on Saturday, June 12.

John Heron, the organiser, was very pleased with the way the show went. More than 500 people turned up to see the exhibits.

Among the attractions were stands from the six local groups with almost every type of micro using demonstrated.

The Ifield School computer facility was represented by Dave Frith who kept seven Pets in continuous operation.

Because of the success of the first Ifield show, plans are already under way for another show next year.

The six groups involved were:

Crawley ZX81 Users Group. Contact John Heron, 23 Polworth Court, Bewbush, Crawley.

Mid Sussex Micro Computer Club. Contact Bernard Langton, Tain, Broadwater Lane, Copsale, Horsham, Sussex.

Brighton Area ZX80/81 Users Group. Contact John Ireland-Hill, 145 Godwin Road, Hove.

Crawley Computer Club. Contact Chris Seager, 43 Jewel Walk, Bewbush, Crawley.

Bognor Computer Group. Contact Neil Vose, Greys Cottage, 38 Alnwick Avenue, Bognor.

Hassocks ZX Micro Computer Users Group. Contact Paul King, 25 Fir Tree Way, Hassocks.

Below: there was plenty of interest at the Sussex micro show at Ifield

Reviews
software

Fortune

AVC Software, PO Box 415 Birmingham
Spectrum 16K-48K cassette
Price £3.00

It is an obvious move when a new machine appears, for software houses to take the easy way out and simply modify their existing library of programs.

The program is one such example — it is a *Spectrum* version of AVC's 16K ZX81 program *Madame ZX81*.

AVC — one is always a little uncertain about buying programs from company's that hide behind a PO Box number — apparently specialise in learning programs. This is about the closest thing to a general interest title in their list.

The program begins by ascertaining the enquirer's vital statistics: name, sex, date of birth etc. and uses these to make predictions of the future.

After a few not entirely successful attempts at humour the fortune-teller displays a fairly accurate line map of the relevant Zodiac sign with personal details superimposed.

There follows a description of the victim's personality with a list of positive characteristics taken randomly together with suitable messages.

The program closes with a hopeful request for money. Presumably one is to cross the computer's palm with silver!

Fortune starts and restarts automatically and is fully mug trapped. Consequently it should be safe enough with hordes of summer fair-goers seeking advance warning of the future.

Summary
A reasonable program for those who have actually got their Spectrum. The new machine is so much more advanced than the ZX81 however that converting games for the ZX81 is not necessarily the best way of providing Spectrum software. **KJ**

Program Enhancement

R & R Software, 34 Bourton Road, Tuffley Gloucester
ZX81 16K cassette
Price £3.95

The Program Enhancement Package or P-E-P is a selection of subroutines to give greater flexibility to the screen display of the ZX81.

The P-E-P tape includes the package itself and a demonstration program to illustrate the scope of the facilities offered.

There are six short machine-code programs included in the cassette: Scroll, Fill-screen, Clear-screen, Inverse screen, Fill-background and Fill-foreground.

In order to use these routines within a program under development by a user the P-E-P must be loaded before the programming session is begun.

The P-E-P begins at line 9980 so there is plenty of room to write programs before the routines. The first line of any program written after the P-E-P has been entered should be Gosub 9983 in order to set up the P-E-P's mnemonics for the entry points to the subroutines and the control variables.

Scroll allows scrolling both up and down the screen. Fill-screen quickly fills the screen with any selected character. Clear-screen is a very fast clear screen facility.

Inverse screen changes every character on the screen to its graphic inverse, and back again if used twice. A development of this will give a flash-inven. Fill-background and Fill-foreground do just that within the same limits as those defined by the Fill screen command.

The P-E-P cassette is supplied with an exhaustive booklet describing the use of the routines.

Summary
A useful selection of subroutines. Essential to anyone interested in graphics or animation on the ZX81. **DK**

Robot Zap

Available from Adda Home Computers Ltd, 154 Victoria Street, London W3 and other Vic20 dealers.
Vic20 cassette 3.5K
Price £3.95

Robot Zap is one of six Vic20 programs written and sold by Simon Taylor of Tayault. His name appears in some of the official Commodore Vic20 software lists.

The game uses joysticks or keyboard control. A rectangular box is created in the screen and ten large crosses or pylons are placed randomly inside the rectangle. Five robots are then placed on the screen and finally you appear.

The robots are programmed to break all three of Asimov's famous laws of robotics. In other words the robots are trying to zap you. The robots are however somewhat simple and with very little skill you can fool them to crash into one of the pylons. If by chance or lack of attention you are ever in trouble you can press the joystick control button to jump elsewhere on the screen.

After a couple of goes all the intricacies of the game has been mastered. This is one of three games for a 3.5K Vic20 which would be fine and interesting to study if one could copy the listing out of a magazine. It is not worth spending £3.95 on it.

Another of Simon Taylor's programs is called Alien Blaster. This also sells for £3.95. The saving grace of this package is that both Robot Zap and Alien Blaster can be bought on the same cassette for £4.95.

Alien Blaster is a far more interesting game which makes impressive use of the Vic's graphics and sound facilities. In the centre of the screen are your laser gun sights. Alien spacecraft appear on the screen one by one.

With a bit of effort on the joystick you can pull the alien ships into your sights and fire at them. The game is a race against your dwindling energy reserves. You start off with 200 units of energy but every shot uses up 10 units. The alien craft fire back and every hit takes 60 units off you.

You can replete your resources by destroying the alien ships. For a program written in Basic on a 3.5K Vic it is quite impressive and certainly better value for money than many of the other Vic programs or cartridges on the market. You can choose for yourself whether to buy Alien Blaster by itself for £3.95 or Robot Zap and Alien Blaster together for £4.95. **D**

Blitz

Commodore 675 Ajax Avenue, Slough Trading Estate, Slough Berkshire
Vic20 (no Ram expansion required)
Price £4.99

As the pilot of a bomber plane, your objective in this game is to flatten the city below so that you can land without crashing. The plane descends with each pass over the city and if you fail to flatten the city you will crash into the side of a building.

This simple and addictive program is one of the better games in the Commodore inside. It is difficult but not impossible to succeed in landing the plane. The problem is that you can only release one bomb at a time and you cannot drop a second one until the first one has exploded.

Your Own Computer

By Michael Waite and Michael Pardee
Sams 222pp p/b
Price £5.55

Little known in this country, Howard Sams is one of America's largest and most prolific computing publishers.

On the whole their publications tend to look rather unappealing — and this book is no exception. The impression from a casual view is that the design and presentation are anything but eye-catching.

The book is a fairly important one however. It provides a reasonably successful beginners guide to microcomputing combined with a small buyer's guide.

The main drawback of *Your Own Computer* is that the view it takes is primarily an American one. There are books published in this country, such as *The Personal Computer Book* by Robin Bradbeer which deal with the topic in a more informative and relevant way for a UK reader.

However it does offer a very interesting picture of home computing in the US. The authors look at 30 computers commonly found in American homes. Although the list includes well-known machines such as ZX80s, Ataris, TRS80s and Apples, it also includes less familiar ones, such as Cromemcos. Costing as much as £10,000, these higher priced micros are apparently not unusual additions to American domestic life.

Summary
Although it may not be as useful to micro owners in the UK as it has been to those in America, the book is still worth a look. **KJ**

Keyboard Repeat

Haven Hardware, 4 Asby Road, Asby, Workington, Cumbria.
Price £3.50 (kit) and £4.95 (built)

A device which makes the keys of a ZX81 repeat after a certain time can be very useful.

Just think over the number of times that you have had to slowly tap the cursor keys to get back to a mistake in order to amend it.

Another use is when making up Rem statements for use with machine code where up to 256 characters have to be entered to store the code at the beginning of a program.

This little printed-circuit board, approximately one inch square, will provide the facility if you are willing to pick up a soldering iron. The board has to be soldered to nine points on the ZX81's printed-circuit board. Five of these links go to the data lines from the ZX keyboard and two go to the +5 and 0 volts. The other two are attached to two control signals beneath the Z80A microprocessor.



Making black on white become white on black: the Inverse Video Module (left)

Fitting these connections is fairly straightforward if you have used a soldering iron before. If you have not, then there is a problem since the sparse instructions will give you no help at all.

Again the building of a kit will cause no problems to those used to a soldering iron.

On the review model there were no sockets even though the instructions included with the kit say they are recommended. The capacitors were also soldered vertically instead of being laid flat on the board as shown in the diagram supplied with the unit. This made it impossible to close the case unless the printed-circuit board was turned round so that the capacitors were against the ZX81's circuit board.

Once fitted the board worked well and every key repeats even when used with Shift.

Summary
The board works very well when fitted beneath the keyboard on the ZX81 and will even work with other keyboards fitted. But kits could however be assembled so that they can be fitted more easily. The instructions also need some revision to be more explanatory than at present. **SA**

Inverse Video Module

Haven Hardware, 4 Asby Road, Asby, Workington, Cumbria.
Price £4.95

This unit, about the size of a 10p piece, is supplied fully assembled and ready to solder on to the video circuitry of a ZX80 or ZX81.

The simple connections to the printed-circuit board are: (a) +5 volts, (b) 0 volts, (c) video in from the printed-circuit board, and (d) video out to the metal-canned video modulator.

Only one alteration has to be made to the ZX81 circuitry, which is to remove the video input wire coming out of the modulator from the printed-circuit board. This is then connected to the inverse video module instead.

The printed-circuit board is small enough to fit underneath the video modulator inside the case.

The instructions are simple enough to follow but no hints on soldering are given. A change-over switch can be fitted if required to switch between inverse video and normal. This is not included in the kit but a suitable switch can be obtained in any electrical store.

The one problem encountered with the unit was its instability. The 4700 pF capacitor required changing to a 0.1 µF. After this the video could be adjusted by means of the variable resistor into the inverse video range. All this should be done of course after the power has been switched on again after soldering.

Summary
This is a useful unit, allowing the use of a ZX81 on tvs previously considered unusable because of their high sensitivity. However, it is debatable that inverse video in the case white on black, is, as claimed by the manufacturer, clearer to see than the more usual black on white. The instructions could be better and clearer. Problems such as that found with the capacitor could be avoided by testing the units more thoroughly. The price is quite cheap and well within the ZX user's price range. **SA**

Watching the characters as they grow . . .

Martin Houston explains how to create user defined characters

This is a utility program called Chr$maker for the ZX Spectrum.

Page 94 of the Spectrum manual gives a simple three line program for creating user defined characters:

```
10 FOR N=0 TO 7
20 INPUT ROW: POKE USR "P"+N,ROW
30 NEXT N
```

In this case "P" is the graphic character that is re-defined.

But, this approach has several disadvantages. The value of Row has either to be worked out or entered in Bin format. In addition, there is no feedback to the user as the character is built up.

With my program a character can be built up and edited with a large screen display showing how it looks. Binary strings input by the user are also displayed as eight decimal numbers suitable for defining the same character from within the user's own program, using the above mechanism.

The program is a fast and enjoyable way of defining and editing the Spectrum character set.

Incidentally, I wrote this program on the day after my Spectrum arrived. This shows how fast it is to get used to the Spectrum, particularly for anyone who has used a ZX81.

```
10 REM User defined character making program
11 REM © Martin Houston 16 Wrs... Close Chelmsford Essex
15 PAPER 6
30 DIM c$(8,8): REM Matrix array
40 PRINT AT 0,0;"[illegible]"
60 PRINT "Input the 8 S matrix of the character 1 line at a time using 0 and 1 to make binary strings. Input 9 to the row prompt to stop"
55 BRIGHT 1: PRINT AT 10,18;"0 use to": PRINT AT 11,12;"fill all rows": PRINT AT 12,12;"even if blank": BRIGHT 0
60 REM write grid
65 PRINT AT 7,3;"colums"
70 PRINT AT 8,2;"12345678"
80 FOR y=9 TO 16: PRINT AT y,1;y-8: PAPER 7: NEXT y
90 PRINT AT 10,0;"r": PRINT AT 11,0;"o": PRINT AT 12,0;"w": PRINT AT 13,0;"s"
95 REM array reading loop
96 DIM a(9): REM bugtrap
100 PRINT AT 21,0;"Which row(1-8) ?"
101 LET r$=INKEY$: IF r$="" THEN GO TO 101
102 IF (CODE r$<49) OR (CODE r$>57) THEN BEEP .5,1: GO TO 101
103 LET row=VAL r$: LET a(row)=1
104 IF row=9 THEN GO TO 1000
105 PRINT AT 21,0;"           12345678"
106 PRINT AT 21,0;"row ";row
110 INPUT "Input row",c$(row)
120 FOR f=1 TO 8: IF NOT ((c$(row,f)="1") OR (c$(row,f)="0")) THEN BEEP 1,-10: GO TO 110: REM check for mistakes
130 NEXT f
200 REM display c$
205 PRINT AT 8+row,2;
210 FOR x=1 TO 8: IF c$(row,x)="1" THEN PRINT "█";
215 IF c$(row,x)="0" THEN PRINT " ";
217 NEXT x
220 GO TO 100
300 REM character production
310 DIM a(8): REM for holding the numbers to be poked
320 FOR r=1 TO 8
325 LET a(r)=0
330 FOR i=0 TO 7
340 IF c$(r,8-i)="1" THEN LET a(r)=a(r)+2↑i: REM conversion of binary string to decimal
350 NEXT i
360 NEXT r
400 REM ask which graphic letter
410 INPUT "Please input the graphics letter to be redefined (A-U) ";l$
415 REM assignment of graphic
420 FOR t=0 TO 7
430 POKE USR l$+t,a(t+1)
440 NEXT t
500 CLS: PRINT AT 10,10;"Chr$ ";l$;" now assigned ";CHR$ (144+CODE l$-65)
505 PRINT "Decimal data of this character is": FOR e=1 TO 8: PRINT a(e): NEXT e
510 INPUT "Another run? Y/N ";q$
520 IF q$(1 TO 1)="y" THEN RUN
530 BEEP .3,10: CLS
540 GO TO 9999
1000 LET f1g=0: FOR f=1 TO 8: IF a(f)=0 THEN LET f1g=1
1005 NEXT f
1010 IF f1g=1 THEN PRINT AT 21,0;"*** [illegible] ***": BEEP 0.5,-5: LET f1g=0: GO TO 100
1020 PRINT AT 21,0;"         ** THINKING **": GO TO 300
```

Reader's contribution

From circles into cones

This program enables you to draw two cones on the screen. You are free to select the colour, size and tilt of the cones.

The cones are created by drawing circles of steadily diminishing size. The maximum circle size is 50.

Andrew Astrand

```
10 INPUT "ENTER INK COLOUR OF THE CIRCLES ";[illegible]
20 INPUT "ENTER BORDER AND PAPER COLOURS IN THAT ORDER ";[illegible]
30 INPUT "ENTER THE SIZE OF THE CIRCLES YOU WISH ";[illegible]
40 INPUT [illegible]
[illegible]
```



Open Forum

Open Forum is for you to publish your programs and ideas
It is important that your programs are bug free before you send them in. We cannot test all of them
Contributions should be sent to Popular Computing Weekly, Hobhouse Court
19 Whitcomb Street, London WC2H 7HF

How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week.

The author of that program will qualify for DOUBLE the usual fee we pay for published programs.
(The usual fee is £10.)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette.

The program will be well documented, the documentation being typed with a double spacing between each line.

The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.

Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper avoiding any creasing.

Please enclose a stamped self-addressed envelope.

Code Cracker

on ZX81

Code Cracker is the Moredrd Mastermind game in which the computer generates a code using the numbers 1 to 6. The computer gives clues in the form of the number of blacks or whites you get. Blacks are where you get both the number and position correct, whites are where you get only the number correct.

You have ten guesses at the code after which the code will be revealed. For each attempt you are asked for your guess in the form 1234, or you may enter "R" to reveal the code and end the game.

Program notes

Lines 10 to 50 set up the main variables
Lines 60 to 80 set up the random code which you must guess
Lines 120 to 160 ask for and decode your entry
Lines 170 to 250 count the number of blacks scored
Lines 260 to 340 count the number of whites you scored
Lines 350 to 420 decide if you scored four blacks or you ran out of guesses and give the option of another game

Code Cracker
by Ian Hunter

```
  10 LET C$=""
  20 LET O=PI-PI
  30 LET U=CODE "="
  40 LET E=CODE "["
  50 LET R=CODE "-"
  60 FOR N=U TO E
  70 LET C$=C$+STR$ (INT (RND*6
E)+U)
  80 NEXT N
  90 CLS
 100 PRINT TAB R+R;"[illegible]"
,AT U+U,O;"CODE  GOES  BLACK  W
HITE"
 110 FOR N=U TO R+R
 120 PRINT AT 20,R;"ENTER CODE E
G 1234  OR ""R"" TO REVEAL"
 130 INPUT G$
 140 IF G$="R" THEN GOTO 370
 150 IF LEN G$<E THEN GOTO 130
 160 PRINT AT 20,R;"
                      ";AT N+
3,O;G$;TAB 7;STR$ N
 170 LET B=O
 180 LET W=O
 190 LET D$=C$
 200 FOR X=U TO E
 210 IF G$(X)<>D$(X) THEN GOTO 2
50
 220 LET D$(X)="7"
 230 LET G$(X)="8"
 240 LET B=B+U
 250 NEXT X
 260 FOR X=U TO E
 270 FOR Z=U TO E
 280 IF D$(X)<>G$(Z) THEN GOTO 3
20
 290 LET D$(X)="9"
 300 LET G$(Z)="0"
 310 LET W=W+U
 320 NEXT Z
 330 NEXT X
 340 PRINT TAB 14;B;TAB 21;W
 350 IF B=4 THEN GOTO 390
 360 NEXT N
 370 PRINT AT N+R,O;"CODE ";C$
 380 GOTO 400
 390 PRINT AT N+R,O;"WELL DONE"
 400 PRINT "[illegible]"
 410 INPUT A$
 420 IF A$="" THEN RUN
```

[illegible]

CODE	GOES	BLACK	WHITE
1122	1	[illegible]	0
3344	2	[illegible]	1
5566	3	[illegible]	0
4381	4	0	2
5546	5	1	1
3244	6	1	1
3286	7	3	0
3465	8	4	0

WELL DONE
[illegible]

Accounts

on Vic 20

This program is designed to run on the basic Vic20. The program allows for account data to be read from a cassette tape or for a new set of data to be started.

Once the account data has been read from cassette or the new balance is typed in the user is given the option to display the account on the screen, input new credit or debits, or to stop the program by dumping the account data back on to tape. Full use is made of Vic colour and once the program is completed the screen is automatically returned to normal.

The program has prompts to help the user operate the program. The account data held includes either the cheque number involved or a simple explanation of the transaction, the sum involved and the current balance.

If account data has previously been dumped to tape this data can be reread into the program. When the program is stopped the closing routine asks for a filename to be used on the tape — eg 4TH JUNE or JUNE01.

For added clarity all credit sums are displayed in green and debit sums in red with reverse on. On a black and white TV it is still possible to differentiate which is which by the light or darker shading.

If you are using the program for the first time you set your present account balance, then type in the credit or debit transactions; you then can display the information and/or dump the information to stop.

Due to the basic Vic20 limitation on user available Ram the program is restricted to three pages of account data — 45 entries. This restriction can be overcome if you dump the current data on to cassette, rerun the program, type in the current balance and then continue. The account is capable of handling any sums up to £9999.99.

When displaying the account if there is no data on the page the user requests the instruction is ignored. A lower numbered page must be typed. If there is no data held in the account you cannot display it. You must first type in a credit or a debit.

Line 5 Set up account data arrays. D = Account details, N = Sums involved and CD = Account whether sums are credits or debits.
Lines 15 to 55 User is given the option to data data from cassette or reset (new) balance.
Lines 100 to 500 Program is now operational and the user is asked what he wants to do (see 540 to 590).
Lines 2000 to 2018 This is the routine for accepting credit/debit data into the account program. Traps are provided to ensure the cheque number or event equals 8 characters and that only CR for credit or DR for debit is typed.
Lines 2100 to 2900 Calculation of the credit or debit

to read page

Accounts

by Keith Hall

```
[illegible]
2610 INPUT [illegible]
2706 IF CD$ [illegible] THEN [illegible]
2716 [illegible]
2720 [illegible]
2900 PRINT "[illegible]ANOTHER INPUT Y[illegible]
2920 GET A$ [illegible] THEN[illegible]
2930 IF H$= [illegible] THEN 2000
2950 GOTO100
4000 POKE[illegible] PRINT [illegible] TOP
4005 GOSUB5350 IFA$ [illegible]
4010 IFA$= 0 THEN[illegible]
4015 IFA$= 1 THENRI=1
4017 IFA$= [illegible] THENRI=1
4020 IFA$= 3 THENRI=31
4100 IFRI [illegible] THEN4000
```

from previous page

and the placing of the data into the correct position in the arrays. Finally the user is asked if there are anymore inputs.

Lines [illegible] to [illegible] Routine for displaying the account data on to the screen also setting the credit/debits in red or green with reverse on.

Lines [illegible] to [illegible] Subroutine for ensuring that all sums are displayed with the decimal points in line one under the other.

Lines [illegible] to [illegible] Routine for saving the program and saving the account data on to tape. The user is asked to set the filename to be used.

Line [illegible] Statement used to correct cheque/event details.

Lines [illegible] to [illegible] Get statement used as a sub-routine to save lines.

The following lines must be modified to increase arrays.

Line 6 increase array sizes. 1 page = 15 entries. Array size to be number of pages X15 +1. (16 = approx three pages).

Line 4070 should be Filename to equal array size.

Line [illegible] should be increased to number of pages X15.

Line [illegible] changed to the number of pages required. After [illegible] insert lines for the number of pages required. THEN R1 = should be increased by 15 [illegible] time. For [illegible] four R1 = 40.

```
[illegible]
```

Keyboard Bleeper

on Vidu? Cenic

This short machine code subroutine will make a short bleep every time a key is pressed. This is useful when touch typing and the subroutine also debounces the keyboard. The first listing is an assembly language listing of the program while the second is a Basic listing which can be typed in directly.

First I will give an explanation of the assembly language listing. Lines 300 to 700 change the keyboard driver pointer so that it now points to the bleeper subroutine. This means that every time the computer wants to know if a key has been pressed it will jump into the bleeper subroutine.

Lines 800 to 2100 search through eight bytes and checks to see if any of them contain a value other than zero. If it is found that one of them does contain a value other than zero then it signifies that a key has been pressed and control is passed on to line 2200.

The last section of the program makes the actual bleep sound. The reason it is so short is because it uses a call to Rom in line 2300. This call is usually only made when writing data to the cassette but since the sound box uses the same channels as the cassettes the Rom call can also be used to produce sounds.

The only thing that needs to be said about the Basic listing is that the memory size does not have to be set since the program does it by itself. The data value in line 50 can be changed to alter the length of the bleep.

Keyboard Bleeper
by Roy Gardner

```
[illegible]
```

Torpedo

on ZX81

Torpedo is a fast-moving graphic game which occupies less than 4K of the expanded ZX81. The idea of the game is to torpedo as many of the 15 ships as possible as they move across the top of the screen at different speeds.

You control the torpedo base at the bottom of the screen on the dashed and can move it to the left and right with the 2 and 4 keys. To fire a torpedo press 9. Make sure you don't waste your torpedoes as you only have one for each ship.

One feature of the program is the full 24 line display. This is achieved by poking 16418 with 0. The memory location 16418 is one of the computer's system variables and has the job of remembering how many lines are in the lower part of the screen.

Many memory saving techniques have been employed, the most obvious of which is the use of PI-PI and PI/PI instead of 0 and 1. It is also cheaper in memory terms to say LET S=VAL "22" rather than LET S=22, a useful point to remember if you're running close to the limits of your computer's memory.

It is also worth noting that there is no limit to the number of print statements you can have in one line. This saves memory and also has the program run faster.

The main repeated loop of the program is from line 140 to 190. When 9 is pressed the variable C is set to 0 and then the main loop is made to include lines 100 to 140 which release and move the torpedo.

Torpedo
by Ian Benyon

```
  8 POKE 16418,PI-PI
 10 LET S=VAL "22"
 20 LET H=VAL "12"
 30 LET I=VAL "6"
 50 LET A=PI-PI
 55 LET T=PI/PI
 60 LET SC=A
 70 LET G=VAL "2"
 80 FOR N=A TO VAL "31"
 90 PRINT AT VAL "23",N;"▀";AT I,N;"-"
 91 NEXT N
 92 FOR F=T TO VAL "15"
 93 PRINT AT A,A;"SHIP NO. ";F;AT A,22;"SCORE= ";SC
 95 LET Z=VAL "(RND*3+1)/5"
 96 LET O=A
 97 LET C=T
 98 LET Y=VAL "20"
 99 GOTO VAL "140"
100 IF Y<>20 THEN PRINT AT Y+G,X;" "
103 PRINT AT Y,X;"O"
104 IF Y=I THEN GOTO VAL "200"
108 LET Y=Y-G
130 NEXT M
140 FOR M=A TO VAL "28" STEP Z
144 IF INKEY$="2" AND S>PI/PI THEN LET S=S-G
145 IF INKEY$="4" AND S<VAL "26" THEN LET S=S+G
150 PRINT AT VAL "5",M;"[illegible]";AT I,M;"-";AT 20,S;"[illegible]"
155 IF C=0 THEN GOTO VAL "100"
160 IF INKEY$="9" THEN LET C=O
165 LET X=S+VAL "3"
170 IF C=O THEN GOTO VAL "100"
190 NEXT M
195 GOTO VAL "290"
200 IF X>=INT M+G AND X<=INT M+VAL "8" THEN GOTO VAL "250"
210 GOTO VAL "290"
250 FOR N=T TO VAL "15"
255 PRINT AT H,H;"[illegible]";AT H,H;"* HIT *"
265 NEXT N
260 PRINT AT H,H;"       "
270 LET SC=SC+T
280 PRINT AT I,M;"------";AT VAL "5",M;"      ";AT I-X;" ";AT I,VAL "26";"------";AT VAL "6",VAL "25"
290 NEXT F
300 PRINT AT 10,8;"YOU SCORED ";SC;AT 14,T;"[illegible]"
310 IF INKEY$="" THEN GOTO VAL "310"
320 CLS
330 RUN
```

Maths Quiz

on Vic20

This is a simple maths program for the unexpanded Vic20. First of all the program will print out a question either addition, subtraction, multiplication or division.

The numbers chosen for the question will be in the range of 0 to 50 but this can easily be changed by changing the value in the Rnd statements from 50 to whatever. If the answer that you input is equal to the answer then the computer makes a sound and prints the big tick.

If you answer wrongly then the computer makes a lower sound and prints a big cross. This program takes up about 1½K.

Maths Quiz
by Neil Sibley

```
  PRINT "[illegible]   MATHS QUIZ  POKE36879,9
2 PRINT "[illegible]ANY KEY TO START":PRINT
  "[illegible]"
4 GETA$:IFA$="" THEN4
20 B=INT(4*RND(4)+1):ONBGOTO 80,90,100,120
100 REM ADDING
101 B=INT(50*RND(1)+1):W=INT(50*RND(1)+1)
```

Reflections

on ZX81

This program allows you to create your own patterns. It is deliberately short so that as much of the memory of the 1K machine

to next page

Open Forum

from previous page
as possible is available for the screen display.

When the program is run four pixels appear on the screen. You will control the top left pixel with the cursor keys — unshifted — in the top left quarter of the screen. The computer produces the mirror images of your pattern in the other three-quarters of the screen.

If you hold a cursor key down the pixel will auto-repeat in that direction until it reaches the boundary when it will stop. To copy a finished picture *Break* the program and enter *Copy*.

To start in a different position move the pixel to the required position, *Break* the program then *Continue*.

Lines 10 and 20 set the initial pixel in the bottom left corner of the top left quarter of the screen.

Line 30 moves the pixel to the left or right if key 8 or 5 is pressed and it hasn't reached the boundary yet.

Line 40 moves the pixel up or down using the same logic as line 30.

Lines 50 to 100 plots the position of the pixel and its three reflections.

Line 110 returns position to the beginning of the loop.

Labyrinth

on ZX81

In Labyrinth you are placed in an underground maze from which you must escape before the keeper of the Labyrinth captures you. You suffer a fate worse than Sinclair white-out.

To escape from the maze you must reach the exit on the right hand side of the maze. The maze is unlit so you cannot see any obstructions until you meet them. As you and the keeper travel around the maze you leave lit passages.

You are represented by the O and the keeper by the X. Beware of the keeper. He homes in on you and if he becomes angry he will cheat and slip between two obstructions.

You move using the cursor keys 5 to 7 and 8 to in the direction shown on the key.

At the beginning of the game you are asked which level of play you want. This governs the ratio of moves you can make to the number the keeper can make.

Program notes

Lines 0 to 60 ask for the level of difficulty you require.
Lines 70 to 130 set up the random maze.
Lines 140 to 240 set the variables and print the unlit maze.
Lines 250 to 370 allow the player to move by checking if he hits an obstruction or if he moves into open space and then prints the player at this position.
Lines 380 to 460 allow the keeper to home in on you and print his new position.
Lines 470 to 520 decide if you have been captured or escaped and prints its decision, and offers you the option of another game.

```
102 PRINT "[illegible]
106 PRINT [illegible] INPUT [illegible] IF[illegible]THEN150
140 PRINT [illegible]
141 PRINT [illegible]
142 PRINT [illegible]
143 PRINT [illegible]
144 PRINT [illegible]
145 PRINT [illegible]
146 PRINT [illegible]
147 POKE[illegible]76 15 POKE36876 200 FOR[illegible]TO200 [illegible]
    POKE36876 0 POKE36876 240 FOR[illegible]1TO200
148 NEXT[illegible]POKE36876 0 GOTO 8
150 PRINT [illegible]
151 PRINT [illegible]
152 PRINT [illegible]
153 PRINT [illegible]
154 PRINT [illegible]
155 PRINT [illegible]
156 POKE[illegible] POKE36874 172 FORT=1TO200 NEXT[illegible]
    POKE36874 [illegible] FORT=1TO200 NEXTT
157 POKE36874 0
158 GOTO20
200 REM MINUSING
201 [illegible]=INT[illegible]RND(1)+1)
205 PRINT "[illegible]SUBTRACTION SUMS
206 PRINT [illegible] INPUTR IFR=[illegible]THEN140
207 GOTO 50
250 GOTO20
300 REM [illegible]
301 Q=INT[illegible]+1) W=INT(50*RND(1)+1)
305 PRINT "[illegible]MULTIPLICATION SUMS
306 PRINT[illegible] INPUT[illegible]THEN140
307 [illegible]
350 [illegible]
400 REM [illegible]
401 [illegible]=INT[illegible]+1) [illegible]=INT(50*RND(1)+1)
405 PRINT "[illegible] SUMS
406 PRINT [illegible] INPUTR IFR=[illegible]QTHEN140
407 GOTO150
450 GOTO20
459 END

READY.
```

Reflections

by Simon Hunt

```
1 REM *** REFLECTIONS ***
2 REM ** FOR 1K ZX81 **
3 REM ** BY SIMON HUNT **
4 REM ** JUNE 10 1982 **
[illegible]
```

REFLECT

PROGRAM OF THE WEEK

Labyrinth
by Ian Hunter

```
10 [illegible]
20 PRINT [illegible] 11 LABYRINTH [illegible]
[illegible] 11 [illegible] AT 5,1 ENTER
LEVEL OF DIFFICULTY EASY TO HARD
(1 TO [illegible])
30 INPUT [illegible]
40 IF [illegible] L [illegible] THEN GOTO 30
50 FAST
60 CLS
70 DIM A(20,19)
80 FOR N=1 TO 100
90 LET Y=INT (RND*19)+1
100 LET X=INT (RND*19)+2
110 IF (Y [illegible] OR [illegible]) AND (X 18
OR X=19) THEN GOTO 90
120 LET A(Y,X)=1
130 NEXT N
140 LET [illegible]=10
150 LET X=1
160 LET R=Y
170 LET [illegible]=19
180 LET [illegible] 0
190 SLOW
200 PRINT AT 00,0
[illegible] AT 0,0
210 FOR N=1 TO 18
220 PRINT
230 NEXT N
240 PRINT AT 18,20
250 FOR N=1 TO 6-L
260 LET [illegible] [illegible]+1
270 LET Z=
280 LET T=
290 LET Y=Y+(INKEY$= 6 )-(INKEY
$= 7 )
300 LET X=X+(INKEY$= [illegible] )-(INKEY
$= 5 )
310 IF Y=18 AND X=20 THEN GOTO
470
320 LET Y=Y+(Y(1)-(Y>19)
330 LET X=X+(X(1)-(X [illegible] 19)
340 IF A(Y,X)=1 THEN LET X=Z
350 IF A(Y,X)=1 THEN LET Y=T
360 PRINT AT T,Z; AT Y,X; O
370 NEXT N
380 LET E=R
390 LET S=
400 LET V=[illegible](U,X)-(U X)
410 LET R=R+(R,Y)-(R,Y)
420 IF A(R,V)=1 THEN LET R=E
430 IF A(R,V)=1 THEN LET V=S
440 PRINT AT E,S; AT R,V; X
450 IF R=Y AND V=X THEN GOTO 49
0
460 GOTO 250
470 PRINT AT 10,19; AT 10,20
0 ,AT 3,23; YOU AT 3,23, ESCA
PED AT 6,25, IN AT 7,25,C,AT 9
24, MOVES
480 GOTO 500
490 PRINT AT 3,25 YOU AT 5,25
HAVE AT 7,25 BEEN AT 9,26
CAUGHT
500 PRINT AT 10,23; ANOTHER ,AT
18,24 GAME ,AT 17,24 ENTER [illegible]
T 19,22, Y OR N
510 INPUT A$
520 IF A$() N THEN RUN
```



Win the great new ZX Spectrum



All you need to do to enter this award scheme is send us a program in one of the following categories (a) Games (b) Educational/Scientific (c) Business/Office (d) Utility

Programs for each category should be accompanied by a cassette, a copy of the listing and full documentation. Points will be awarded for use of machine code, innovation, structure and ease of use.

The overall winner will receive a ZX Spectrum and Printer. Individual category winners will be awarded £30 of software, and 24 runners-up will receive programming merit awards.

This is the final competition coupon. To enter the competition, you must send in your program together with any four differently numbered coupons to

Popular Computing Weekly
Programming Award Scheme,
Hobhouse Court,
19 Whitcomb Street,
London WC2.

Notes
1 There is no limit on the number of entries you can send in, but each entry must be accompanied by four differently numbered customer coupons.
2 Closing date for entries is August [illegible], 1982.
3 The names of the winners will be announced in the September 16 issue of Popular Computing Weekly.
4 The Judges' decision is final.
5 No employees of Sunshine Publications Ltd or their families will be eligible to enter the competition.

Popular Computing Weekly Programming Award Scheme

Fill in this coupon. When you have collected four differently numbered coupons, send them with your program to Popular Computing Weekly Programming Award Scheme, Hobhouse Court, 19 Whitcomb Street, London WC2.

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PROGRAM CATEGORY ______

5

How to pass Go and collect 200 variables

David Lawrence explains how to use variables as Goto and Gosub destinations

When Sinclair first produced the ZX81 not a few people expressed the opinion that the way in which *Goto* destinations were expressed was extravagant and unnecessary. After all, it was argued, all that is really needed to cope with destinations in the range 1-9999 is five bytes — the line numbers themselves are only two bytes long.

What possible use could there be for the way in which the ZX81 allowed anything which could be interpreted as having a numerical value to be used as the destination for a *Goto*? *Goto* 30, for instance, could also be expressed as *Goto* code "£", *Goto* val "30", *Goto* X, *Goto* 5**2+5, *Goto* 2*X+(Y/3), *Goto* A(3,5) and an infinite variety of other expressions. The same is true for *Gosub*.

At first sight this seems like sheer overkill. In fact, it is a reflection of Sinclair's philosophy of providing the user with real flexibility to compensate for the ZX81's limitations. Many other micros, for instance, provide a useful command usually known as *On ... Goto* (sometimes *Goto ... On*) which allows one of a variety of destinations to be chosen on the basis of a simple condition.

```
ON X GOTO 100,210,350,470,500
```

This means that whenever X is in the range 1-5, program execution will jump to the Xth destination shown, otherwise the instruction will be ignored. This has the effect of replacing, in this particular case, five *If ... Then* instructions.

```
IF X=1 THEN GOTO 100
IF X=2 THEN GOTO 500 etc
```

The ZX81 has no such command. But the extraordinary flexibility of the way in which *Goto* destinations can be expressed does open up a variety of possibilities. *On ... Goto* itself can be simulated quite simply in 2 lines such as

```
10 LET A$="100210350470500"
20 GOTO VAL A$(X*3-2 TO X*3)
```

If there is a possibility of X falling outside the range of options the program is designed to cope with, or if you want a default destination, the following could be used

```
5 LET A$="100210350470500999"
6 IF X>6 OR X<1 THEN LET X=6
10 GOTO VAL A$(X*3-2 TO X*3)
```

For anything lower than the range 1-5 the program will now continue execution at line 30. It could equally have used these to jump back — for instance to a menu with only five alternatives.

For those programming in 1K it is also feasible to use *Goto* values of single characters as destinations, provided that none of the destinations is greater than 255. A$ would need only to have as many characters as there are choices for destinations. The *Goto* instruction would take the form *Goto Code* A$(X).

It is often possible to design a program so that an input value can be used to directly determine a destination. Take the example of a program function to determine how many days have passed since the beginning of the year. The result is achieved by subtracting the number of days in the remaining months from 365. But, note how the jump to the correct month to start subtraction is achieved.

```
10 PRINT"NUMBER OF CURRENT MONTH?"
20 INPUT M
30 LET D=365
40 GOTO 40+10*M
50 LET D=D-31
60 LET D=D-28
70 LET D=D-31 etc.
```

Where the number of lines permits it is also possible to structure a whole program to allow an input to directly determine the destination for a *Goto* or *Gosub*. Take the example of a program which has a menu of five functions.

```
100 PRINT "INPUT CHOICE OF FUNCTION"
110 INPUT X
120 GOSUB X*500
130 GOTO 100
500 SUBROUTINE 1
1000 SUBROUTINE 2
1500 SUBROUTINE 3
2000 SUBROUTINE 4
2500 SUBROUTINE 5
```

It is sometimes possible to base the calculation of a *Goto* destination on figures arising during the course of a program, though this will often mean adopting a very irregular structure of line numbers. In the following example the aim is to calculate the month in which a particular day of the year falls (the day having arisen as the result of previous calculations).

```
10 IF D<=10 THEN LET D=11
20 GOSUB D*2
21 STOP
22 PRINT "JANUARY"
23 RETURN
118 PRINT "FEBRUARY"
119 RETURN
180 PRINT "MARCH"
181 RETURN etc
```

Note how D must in this case be multiplied by two in order to ensure room for the *Return* instructions — there can of course never be a case of D=31.5. If this had not been done, we might have mistakenly numbered the lines

```
31 PRINT "JANUARY"
32 RETURN
```

with the result that nothing would be printed for day 32.

The principle can be applied whenever the action to be taken by a program varies predictably according to the value of a known variable.

Finally, remember that the capacity to use variables as destinations for *Gotos* and especially *Gosubs* gives you the opportunity to put some structure into your programs by using named subroutines. Having decided upon the name for a routine, declare that name as a variable at the beginning of the program and give it a value corresponding to the line number at which the routine commences. From then on you can use lines like *Gosub* instructions which can help to make the functioning of a program much more comprehensible.



ZX81 — the extraordinary flexibility of the *Goto* facility opens a variety of possibilities



Dumping it all on the printer

This is a simple program suitable for Pets and Vics which dumps the contents of the screen onto a printer. It consists of two interactive loops: one for the length of each line and one for the number of lines on the screen. The main routine inside these loops peeks each position on the screen in turn and converts the value into the correct chr$ code for printing.

Line 10180 adjusts the print output so that graphic characters join up vertically on the Commodore 4022 printer. I assume there is a similar process for the Vic printer. Line 10440 resets the 4022 printer to normal. When using the printer in this way the page throw facility is upset and so the top of the form will need to be reset.

Vic owners will be able to convert the program so that the variables LL (line length) and NL (number of lines) can be calculated by peeking control registers 3 and 4 and masking out the unwanted bits.

In control register 3 (36866) bits 0-6 contain the number of columns in the video matrix. In control register 4 (36867) bits 1-6 contain the number of rows in the video matrix. The following statements will calculate the values:

LL=(PEEK(36866) AND 127)
NL=INT(PEEK(36867) AND 127/2)

It should be possible to use this routine to dump Hi-res graphics onto the printer but I have not tried it. I would like to hear if anyone has any success. Also the top of screen variable will have to be altered depending on the method used.

Pet owners with 80 column screens will need to omit lines 10800, 10220 and 10890 and change line 10340 to Print#1. Note that the Print# statements must be typed in full. ?# is not allowed.

The program can be added to the end of the user program which intends to call it or can be Loaded after the screen is completed — as long as the user program is larger in size than the Screenprint program.

Ken Clark

```
10000 REM *** SCREENPRINT **    (C KEN CLARK 1982
10010 REM
10020 REM    TS = TOP OF SCREEN POINTER;   FOR PET'S  TS = 32768
10030 REM    FOR VIC S WITH MORE THAN 8K OF MEMORY  TS = 1024
10040 REM    OTHERWISE  TS = 7680
10050 REM
10060 REM    LL = LINE LENGTH;    FOR VIC S  LL = 22
10070 REM    FOR 40 COLUMN PET S  LL = 40   FOR 80 COLUMN PET S LL = 80
10080 REM
10090 REM    NL = NUMBER OF LINES; FOR PET S NL = 25   FOR VIC S NL = 23
10100 REM
10110 TS=32768:LL=40:NL=25
10120 REM
10130 REM *** OPEN PRINTER AND ADJUST SPACING FOR GRAPHICS ***
10140 REM
10150 OPEN1 4:CMD1
10160 OPEN 6 4 6:PRINT#6 CHR$(24):CLOSE 6
10170 REM
10180 REM *** START SCREEN BOX ***
10190 REM
10200 PRINT#1 "  ";:FOR Z=1TOLL:PRINT#1 " ";:NEXT Z:PRINT#1 " "
10210 FOR YLOOP=1TONL
10220 PRINT#1 " ";
10230 FOR XLOOP=1TOLL
10240 REM
10250 REM *** GET A CHARACTER FROM THE SCREEN AND CONVERT ***
10260 REM
10270 R=PEEK(TS)
10280 IF R 191 AND R<224 THEN PRINT#1 "";CHR$(R);"";:GOTO10320
10290 IF R>127 THEN PRINT#1 "";CHR$(R-64);"";:GOTO10320
10300 IF R>63 AND R<96 THEN PRINT#1 CHR$(R+128);:GOTO10320
10310 PRINT#1 CHR$(R+64);
10320 TS=TS+1
10330 NEXT XLOOP
10340 PRINT#1 " "
10350 NEXT YLOOP
10360 REM
10370 REM *** FINISH SCREEN BOX ***
10380 REM
10390 PRINT#1 "  ";:FOR Z=1TOLL:PRINT#1 " ";:NEXT Z:PRINT#1," "
10400 REM
10410 REM *** CLOSE & RESET PRINTER ***
10420 REM
10430 CLOSE1
10440 OPEN10 4 10:PRINT#10:CLOSE10
```

Peek & poke

Peek your problems to our address. Ian Beardsmore will poke back an answer

ER, WHAT DO I DO NOW PLEASE?

David Scott of [illegible] Avenue Glenrothes Fife writes

Q I am at present the owner of a Thoro pocket computer but I am wondering buying a larger colour computer such as the ZX Spectrum, or a Vic20. I wonder if you could answer some questions for me.

Is there any memory expansion available for the Vic20 larger than 48K? Are there any plans to let the Spectrum or the Vic20 be suitable for other languages such as forth, CP/M or Pascal? What can the RS232 interface be used for besides printers?

Have you any details of the Vic30 and the Vic64 new colour computers? What sort of price are they?

Are the Spectrum and the Vic20 capable of outside communication ie modem? If so, who supplies these? Also do you publish programs for the TRS80 pocket computer?

A A lot of questions to answer but here I go. There is a disc drive available for the Vic20 which stores 174K that can be accessed in 664 blocks. There is a review of the disc drive in our May 20 issue. The drive is available from Commodore in Slough for £396.

Commodore do a forth cartridge for the Vic and forth is available for the ZX81. So a Spectrum version is very possible given that ZX81 Basic is more or less a complete subset of Spectrum Basic.

CP/M is to my knowledge not available for the Vic. It is a Z80a based system so it is possible that it might be developed for the Spectrum in the coming months especially once the microdrive is released.

An RS232 interface can be used for printers or for modem. While it is used to interface other peripherals the printer option is the most common. Depending on the individual computer the RS232 can be used for sound boards extra graphic boards, packs and for the external control of anything from model railways to robots to Viewdata access.

I wrote about the Vic30 in *PCW* July 15. The Vic64 is just a 64K version of the Vic10 with all the Rom onboard and 20K onboard Rom. It can control two joysticks and four paddles. The price being discussed is £500 and the provisional release date is early 1983.

At the moment I do not know of any modem hardware actually available for the Vic20. As far as the Spectrum is concerned the first models are only getting through now.

As for programs for the TRS80 we are happy to consider programs for any computer. It is sometimes said that we are monopolised by a few machines. What we publish reflects what we are sent. We cannot publish programs for each new item one sends them to us.

TO ERROR IS HUMAN IS IT NOT?

Dave Webb of Stewart Avenue Sandbach Cheshire writes

Q I would like to know how to Poke the error code off the screen using a ZX81 in the same way you can on the ZX80.

A You cannot Poke the error code off in the same way as you can on the ZX80 or ZX80 with new Rom. If you want to move the error code first ensure that you are in Fast mode. Next make the last line of your program LET L=USR 681. When you have done this the program will stop but there will be no error code.

OR TO BE HUMAN IS AN ERROR?

W E Rodger of Sheldon Road Dagenham Essex writes

Q I have two points about which I would like your opinion.

Firstly in the faulty Rom test in the May 13 issue of *PCW*—the line *Print* 2**32−1 gives an answer rounded up to 4294967300 not 4294967296 as found.

Secondly in the program Maze 2 for the ZX81 I keep getting an error code 2 followed by a line number. The line number that follows is always a line that reads NEXT N in 2-630 but it is not always the same line number.

A The answer to your first question is that your Rom should be all right. The correct answer was worked out the old fashioned way by pencil and paper. Because the ZX81 is only accurate to 9 places it has to round up or down any digits after that (see letters *PCW* July 3).

The second problem is caused by a printing error. The +1 should go inside the outer set of brackets on the line should read

16 GOSUB 100* (INT(RND*8)+1)

This generates a whole number between one and nine and then multiplies it by 100. The form as printed gives a number between nought and eight, multiplies this by 100 and then adds one.

So if the number six is generated this will become 600 plus one. The computer is trying to Gosub 601 but it cannot so it goes to the next command working on from there. When it gets to line 630 it shows an error code because it has not been to 600 and therefore does not know what N is.

TO B OR NOT TO BE, THAT IS . . .

M Hubbard of Robert Adam Crescent Hulme Manchester asks

Q Please could you explain to me the difference between a model B BBC microcomputer and a model A micro with a £35 16K memory expansion — apart from the obvious £65 less the printer port. How easy is it to upgrade the model A to the B? I am interested because—apart from financial considerations there is less demand for the A and so less waiting time.

A Essentially the difference between the two is the much greater flexibility of the model B. It has several ports and interfaces that the A does not possess.

The first and probably most useful extra is the Acorn Tube which allows the use of a second processor. This second processor does not have to be a 6502 but could for example be a Z80a. This automatically opens up the vast field of CP/M for the Beeb micro. It also makes the operating times a lot faster because the first 6502 chip does not have to stop calculating to output data. The calculations can all be done simultaneously by the second processor.

The model B also has an RS232 port for use with a serial printer or modem. Other extras include an RGB output for monitors and an analogue port for use with joysticks or laboratory instruments.

When you pay the extra for the model B you are paying for potential as represented by the extra ports. Whether you think it is worth the extra money is up to you but perhaps you can now understand why the model B is out selling the model A by about two to one.

It will probably become possible to upgrade the model A to meet the specifications of the B by using mother boards with additional ports on and when they come on to the market. This will I am sure in the long run cost more and I doubt if the Acorn Tube will ever become available.

STOP agonising over that nagging problem. Write to Ian Beardsmore at Peek & poke for the answer. Letters should be as brief as possible but include full name and address. Try and limit yourself to one question per letter. Write to Peek & poke—*Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

Competitions

It's cool to be a perfect square

A perfect square is a whole number the square root of which is itself a whole number — 4, 9, 16 and 25 are all perfect squares. Any whole number multiplied by itself gives a value which is a perfect square.

A number of familiar ideas are linked to the idea of perfect squares. Noughts and crosses is played on an area of nine cells arranged in three rows of three. This is also to be a square of order 3. Similarly, a chessboard is a square of order 8 and the oriental game of Go is played on a grid of order 19.

Let us take a look at some of the properties of square numbers. First, write out the eleven numbers 0 to 10 and underneath write their squares.

n 0 1 2 3 4 5 6 7 8 9 10
n² 0 1 4 9 16 25 36 49 64 81 100

Notice how the last figure of each of the squares runs in the sequence 0 1 4 9 6 5 6, 9 4 1 0. This can be useful as a negative check that a number is not a perfect square.

If the last figure of any number is either 2, 3, 7 or 8 then the number cannot be a perfect square.

A further check can be carried out using the digital root of a number. To find the digital root add together each of the digits, and then if the total has more than one digit add these digits together until a single digit remains. For example, the digital root of 7344821489038 is

7 + 3 + 4 + 4 + 8 + 2 + 1 + 4 + 8 + 9 + 0 + 3 + 8 = 61
= 6 + 1 = 7

This tells us that the number cannot possibly be a perfect square. To see why here is a program that finds the digital roots of successive square numbers up to 30. If you run it you will see that the digital roots fall in to a cyclical sequence comprising just four different digits. If our digital root is not one of these then the number cannot be square.

```
10 FOR N = 1 TO 30
20 LET A$ = STR$ (N * N)
30 LET A = 0
40 FOR M = 1 TO LEN A$
50 LET A = A + VAL A$ (M)
60 NEXT M
70 IF A > 9 THEN GOTO 300
80 PRINT A
90 NEXT N
300 LET A$ = STR$ A
310 GOTO 30
```

This provides us with a useful negative result.

Puzzle No. 15

Can you find (a) the lowest and (b) the highest perfect square that can be made using in each case the nine digits 1 to 9 (each digit is used only once, and zero is not used)?

Solution to Puzzle No. 11

1 3 4 5875 5877 5879

R. C. Frost

The bee flies a total distance of 264 040 feet (48 miles 160 yards) — making it an incredibly industrious insect.

The program is given the solution whole by incrementing D by 2 to give the distance between each successive flower. This is added to H to give the distance to the hive and then the distance (to allow for the return journey) is added to T, the total distance flown.

The program stops as soon as H exceeds 5280 ft (1 mile).

```
10 LET T = 0
20 LET H = 1
30 LET D = 1
40 LET T = T + 2 * H
50 LET D = D + 2
60 LET H = H + D
70 IF H < 5280 THEN GOTO 40
100 PRINT "TOTAL DISTANCE " T " FEET"
```

Rules

The winner of the puzzle will be the reader who in the opinion of *Popular Computing Weekly* has submitted the best solution. Preference will be given to solutions which show how the entrant arrives at the correct answer.

Envelopes containing entries should be marked clearly with PUZZLE.

The closing date for the competition is Tuesday August 10.

Winner of Puzzle No. 11

The winner is Gary Jones, Green Way, Colne Engaine, Colchester, who receives £10.

Solution to Crossword No. 11

Across: 5 Ace, 8 Hourglass, 10 Elements, 11 Idle, 13 Screen, 14 Report, 17 Lens, 18 Pedigree, 20 Shipyard, 21 Par.
Down: 1 Lasers, 2 Teleprinter, 3 pH, 4 Dusty, 5 Age, 6 Cardiograph, 7 Isle, 12 Reminds, 15 Theory, 16 Relay, 17 List, 19 Ily

Winner of Crossword No. 11

The winner is L. Lightfoot, Lynwood Avenue, Clayton-le-Moors, Accrington, who receives £10.

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BY DAVID IRELAND and JAMES MACDONALD









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